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RE-FOCUSING FOREIGN INVOLVEMENT IN SUB-SAHARAN AFRICA'S POWER SECTOR ON SUSTAINABLE DEVELOPMENT

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International engagement in sub-Saharan Africa's power sector is increasing rapidly. Aid is used to directly finance a growing number of foreign companies to implement power projects, accompanied by calls for policy and governance reform. This paper argues that while new and much-needed finance is becoming available, the current approach to foreign support poses several new challenges for broad and sustainable long-term development of the African power sector. They include a focus on creating market opportunities for non-African rather than domestic companies, the difficulty of delivering large-scale rural electrification through the externally advocated market-based approach, economic inefficiencies of current aid spending, and the difficulty of tackling complex, country-specific issues with continental electrification initiatives. To address these challenges, we suggest to redirect public funds towards rural electrification, increase African ownership, individualise policy interventions and ease the current types of neoliberal conditionalities.

Keywords: Sustainable development; Electrification; Foreign aid; African energy sector; Power Africa.

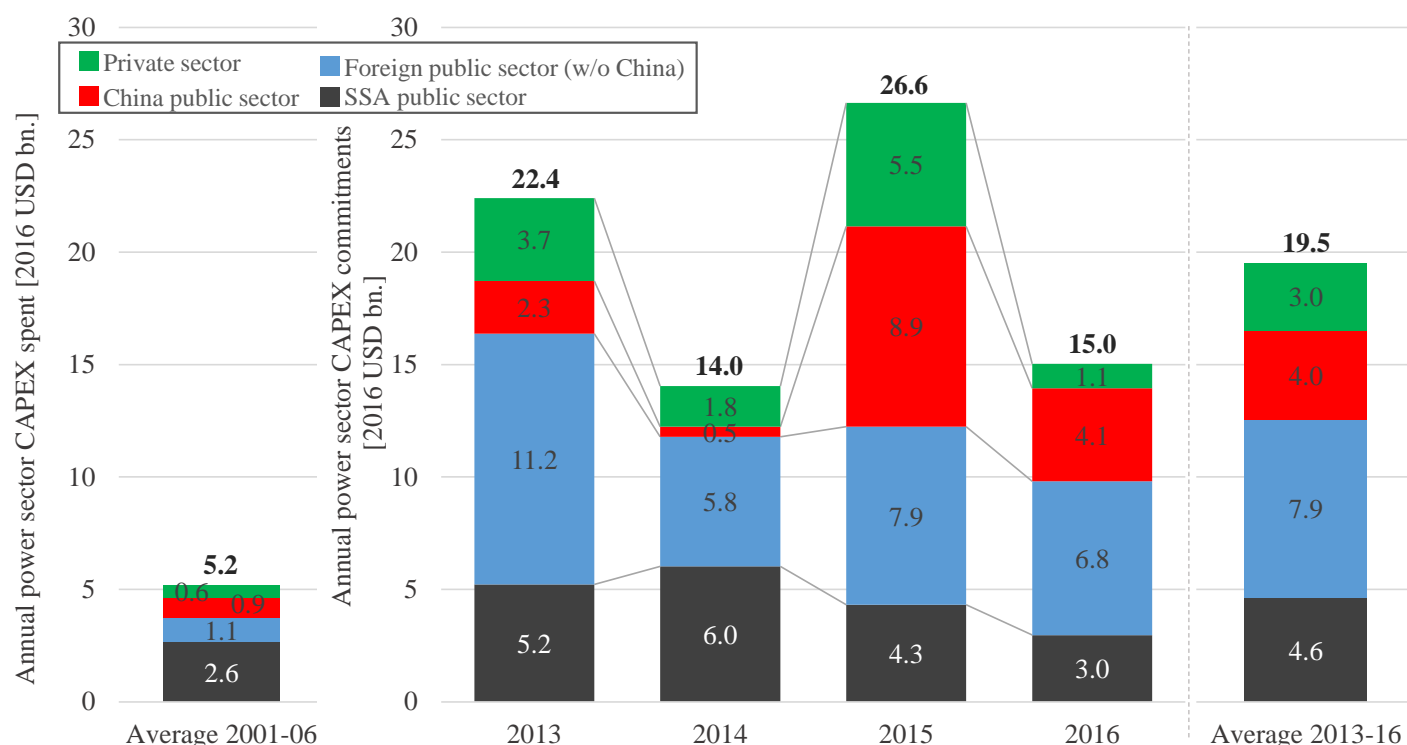
INTRODUCTION

Sub-Saharan Africa's (SSA) current electricity situation is alarming. Roughly 675 million people live without access, SSA firms experience 8.5 power outages on average per month, and the rural electrification stands at 15% (World Bank, 2018). Increased electricity access in SSA has been linked to economic development, local income generation, literacy improvements, and better health care (Abdullah and Markandya, 2012; Cook, 2011). Universal access by 2030 is a UN Sustainable Development Goal (SDG).

The international community has recognised the necessity to act on electrification in SSA. Currently, there are at least 60 international financing initiatives aimed at the region's power sector (Quitow et al., 2016; Tagliapietra and Bazilian, 2017). Foreign capital investments, albeit existing data imperfections, appear to have risen significantly in the last decade. The most recent data, supplied by the Infrastructure Consortium for Africa (ICA), suggest that capital expenditure (CAPEX) commitments have come predominantly from outside Africa

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since the large-scale US-led Power Africa initiative was launched in 2013 (The Infrastructure Consortium for Africa, 2016; The Infrastructure Consortium for Africa, 2017). While the current total annual commitments considerably exceed SSA's power sector CAPEX from 10 years ago, only 25% of which stems from African governments. By contrast, between 2001 and 2006, the majority of power sector CAPEX was spent by African governments (Foster and Briceño-Garmendia, 2010). Figure 1 illustrates this trend.



Note: Foster and Briceño-Garmendia (2010) report actual CAPEX spending between 2001 and 2006, while the ICA reports CAPEX commitments. In its reports, ICA jointly states power sector and gas pipeline commitments. To only report power sector commitments here, the ICA figures have been lowered by 10%. According to both data sources, data inconsistencies such as double counting and misallocations cannot entirely be ruled out. The private sector figures closely match the World Bank's Private Participation in Infrastructure (PPI) database which includes both purely privately financed as well as public-private partnership (PPP) projects.

Figure 1: Capital expenditure spent and commitments in the African power sector (data sources: (Foster and Briceño-Garmendia, 2010; The Infrastructure Consortium for Africa, 2016; The Infrastructure Consortium for Africa, 2017)).

A recent, growing literature has recognized and documented the rising importance of foreign public and private finance in SSA's power sector (Africa Growth Initiative at Brookings, 2017; Eberhard et al., 2017; Gualberti et al., 2014; Moss and Bazilian, 2018; Tagliapietra and Bazilian, 2017). Scholars generally agree on the necessity of additional finance to reach the

SDG. They have pointed out that foreign private sector involvement and large-scale international initiatives like Power Africa are a significant part of securing these funds.

This paper adds to this literature by critically analysing the implications of this rising foreign support for the long-term sustainable development of SSA's power sector. It follows three steps. Firstly, it discusses four mechanisms under which the current foreign support operates, namely (1) the direct financing of non-African companies with development aid; (2) the growing number of foreign stakeholders; (3) the support provision beyond physical infrastructure; and (4) the conditionalities attached to receiving assistance. Secondly, this paper examines the long-term developmental implications of each of these four mechanisms. It draws from various policy reports and empirical cases including Uganda, Kenya, Ghana, Botswana, South Africa, Côte d'Ivoire, Benin, Democratic Republic of Congo, Ethiopia, Zimbabwe and Zambia, as well as several non-African countries. While acknowledging the positive impact on available finance and foreign know-how, this paper points out several that the current mechanisms of foreign involvement imply several new social, economic and political challenges. They include the focus on creating market opportunities for non-African rather than domestic companies, an associated risk of increased aid dependency, the difficulty of delivering large-scale rural electrification through the advocated market-based approach, economic inefficiencies of current aid spending, transparency issues, and the difficulty of tackling complex, country-specific issues with continental electrification initiatives. Thirdly, policy actions are recommended to foster long-term development, addressing each of the four mechanisms. The paper suggests to re-direct public aid towards rural electrification, increase knowledge transfer, customise policy interventions and ease current conditionalities to enable state-driven leadership.

FOUR MECHANISMS OF CURRENT FOREIGN SUPPORT

With financial commitments of over USD 54 billion, Power Africa constitutes the largest multinational African electrification initiative (Power Africa, 2017). Closer analyses of Power Africa and other international efforts uncover four dominant mechanisms of the rising foreign support for African electrification.

1. Usage of aid to finance non-African companies. Since the early 1980s, the World Bank's and International Monetary Fund's (IMF) Structural Adjustment Programs (SAPs) dominated aid provision to Africa. They consisted of loans given directly to African governments with the intention to economically stabilise the recipient countries. The subsequent Poverty Reduction Strategy Papers (PRSPs), introduced in 1999, intended to strengthen the ownership of African states and supported their poverty-reduction efforts. Their main means of aid delivery was direct budgetary support for African states and governmental ministries to help implement developmental policies (Unwin, 2004). Assistance to the energy sector was firmly embedded within these aid delivery regimes, and often coupled to neoliberal reform conditions (Söderholm, 1999). In the last decade, however, SSA's energy sector has emerged as a focus area of aid. While total official development aid (ODA) from the OECD's Development Assistance Committee (DAC) for SSA has been largely constant between 2007 and 2016, ODA for SSA's energy sector specifically has increased by 600% during this time (OECD, 2018). In 2016, DAC-countries committed as much aid to the energy sector as to education in SSA.

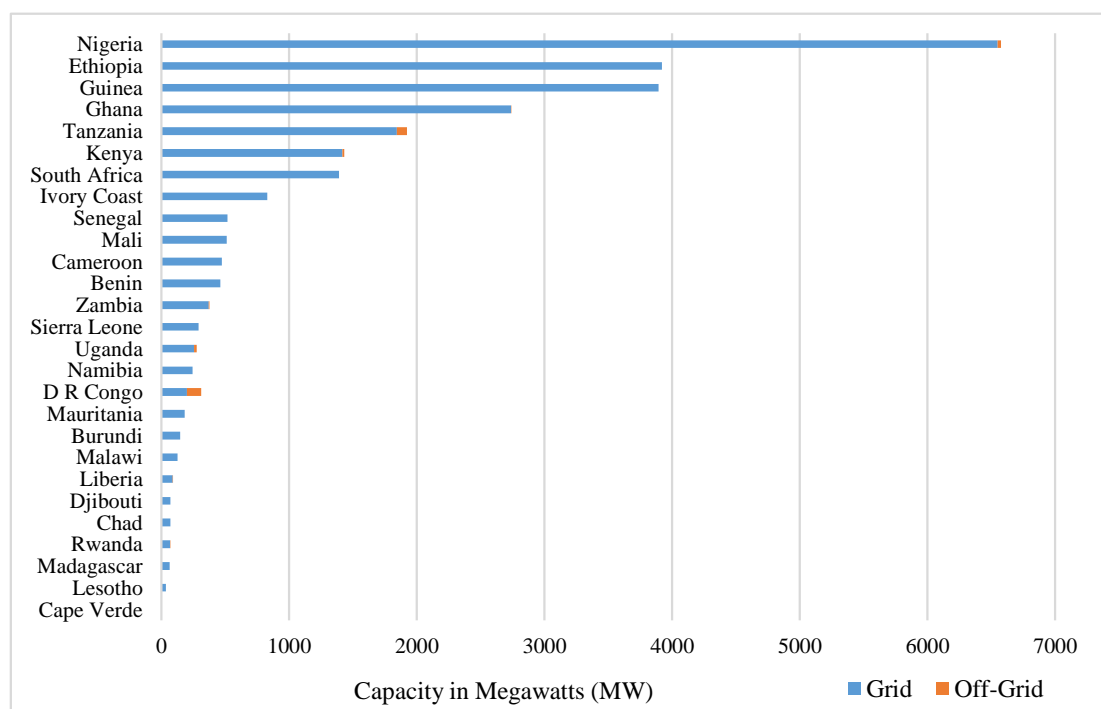
This has coincided with a noticeable trend towards aid privatisation (Hook and Rumsey, 2016). Non-governmental actors have played an increasingly important role in aid delivery. Significant amounts of current public development assistance for African electrification are used to directly fund non-African companies. More than 90% of the USD 7 billion US commitment to Power Africa finances the US government agencies Export-Import Bank (EXIM) and Overseas Private Investment Corporation (OPIC) (Power Africa, 2016a). Both provide capital and insurance to US companies investing in developing countries. Thereby, a considerable majority of US development aid to SSA's power sector is *de facto* retained within the US economy. Indeed, official US estimates expect Power Africa commitments to generate a *positive* return for US taxpayers of USD 86 million (US Congressional Budget Office, 2014). China, similarly, delivers aid by directly financing Chinese companies to build infrastructure in SSA. Germany uses public funds to incentivise German companies to move into SSA, aiming to multiply the number of German companies active in SSA by six. Many electrification initiatives support public-private partnerships (PPPs) and promote foreign direct investments (FDIs) to further encourage foreign company engagement.

2. Increasing number of foreign financiers. In 2016, at least 43 different non-African governments and 28 public sector institutions have been engaged in at least 60 African electrification initiatives (Quitow et al., 2016; Tagliapietra and Bazilian, 2017). This includes the 10 richest OECD countries, the EU, the UN and the World Bank. In addition to public

sector stakeholders, by 2016, Power Africa alone had coalesced over USD 40 billion from over 100 private sector entities, mostly global engineering and equity companies such as General Electric, Standard Chartered Bank and Aldwych International (Power Africa, 2016b). International private sector engagement overall has increased steadily in the last decade (Eberhard et al., 2017).

3. Support beyond physical infrastructure. Most African electrification initiatives engage with the power sector in an encompassing way. They include institutional and technical capacity building, policy reforms, partnership development, coordination and monitoring (Quitow et al., 2016). Large-scale initiatives like Power Africa have developed toolkits to support transaction processes. For instance, Power Africa's Understanding Power Purchase Agreements handbook and its African Legal Support Facility helped secure signing two generation projects worth 105 MW in Benin in 2016. In an attempt to increase transparency, Power Africa has made its Power Africa Tracking Tool (PATT) freely available, tracking the progress of electrification transactions in real-time (Figure 2).

4. Conditionalities. Since the SAPs have been introduced in SSA in the 1980s, development aid has been coupled with conditionalities. Recipient countries had to implement a set of pre-defined, neoliberal policies which limited the role of the state. While the subsequent PRSPs aimed at strengthening African ownership of developmental policies, they have continued aid conditionality and constrained state intervention (Cheru, 2006; Unwin, 2004; Zack-Williams and Mohan, 2005). This approach to aid deliverance remains salient in power sector endowments to SSA today. Power Africa's reform goals include increasing commercial viability, market-based pricing, cutting subsidies, reducing import taxes and guaranteeing political liberties (Power Africa, 2016b). For example, after election rigging allegations surfaced in Tanzania in 2016, US agency Millennium Challenge Corporation (MCC) pulled out of a previously committed USD 473 million generation project. Other African electrification initiatives like Germany's Energising Development or Norway's Energy+ have similarly made funding conditional on policy reforms, reflecting the former country's *Fördern und Fordern* (support and request) aid approach.

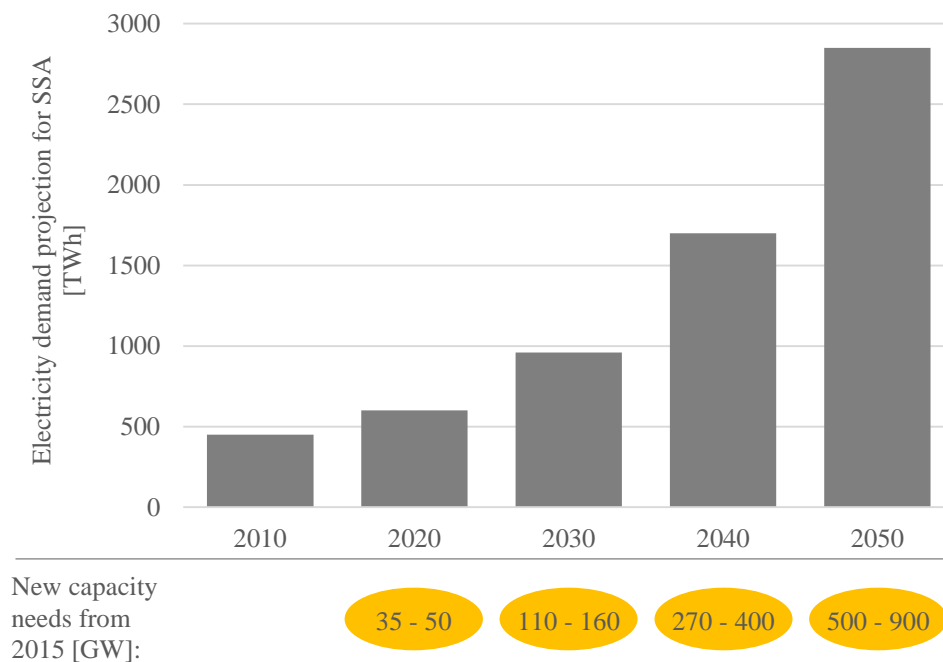


Note: Not all the above projects are financed by Power Africa, but they are all tracked in the PATT

Figure 2: Overview of 297 potential Power Africa projects in 2016 monitored through the PATT (Power Africa, 2016a)

THE MECHANISMS' IMPLICATIONS FOR DEVELOPMENTAL SUSTAINABILITY

African electrification requires a long-term approach. Total electricity demand in SSA is projected to increase almost threefold between 2030 and 2050, requiring significant capacity additions (see Figure 3). This section analyses the implications and potential impact of each of the four foreign support mechanisms concerning long-term development in turn. It closes with Table 1 summarising the findings.



Note: Demand projections are the average of two potential scenarios presented by the World Energy Council (WEC) (World Energy Council, 2013). Capacity needs follow from assuming an average capacity factor range between 33% and 53% in 2050, depending on the energy mix. This capacity factor range is based on International Renewable Energy Agency (IRENA) results for SSA electricity planning (International Renewable Energy Agency, 2015), and increased by a further 10% to account for long-term uncertainties.

Figure 3: Electricity demand projections for SAA (data sources: (International Renewable Energy Agency, 2015; World Energy Council, 2013), authors' calculations)

Implications of using aid to finance non-African companies

Increased financing of foreign companies is raising private sector activity in African electrification (Power Africa, 2017), and the potential scale of new capacity additions. There are, however, several social, economic and environmental issues coupled with this mechanism.

With respect to social issues, the crucial developmental need to electrify the rural population at scale appears to be difficult to achieve when aid is being used to fund foreign companies. This mechanism shifts the mandate of aid from African development towards foreign business interests. Over 80% of the unelectrified people in SSA live in rural areas, yet rural electrification in SSA does not present a market where companies easily achieve attractive margins. More than two-thirds of the unelectrified rural population lives in poverty (World Bank, 2018). In Kenya, poor rural households have required at least 10 years to pay the connection costs (Abdullah and Markandya, 2012). The Korean government granted the rural

poor 35 years to repay loans for upfront costs, an important factor in Korea's holistic, state-driven rural development programme (Van Gevelt, 2014). Limited liquidity and the long resulting cost-recovery timeframes are at odds with the private sector's pressure to achieve short-term returns, especially for high-risk investments in politically and economically volatile countries. In addition, electrification initiatives often focus their efforts on quantitative targets for new capacity additions, thereby defining cost per MW as a key decision parameter (Quitow et al., 2016). Power Africa, for instance, explicitly aims to add 30,000 MW of installed capacity by 2030. Off-grid technologies, often best-suited to electrify rural households, are considerably more expensive per MW and less profitable than grid-connected electricity which can be used to power the industrial sector. Despite contrary intentions, off-grid technologies account for only 0.9% of the capacity of all tracked Power Africa transactions (Figure 2).

An important caveat of international initiatives supporting distribution in general is its governance complexity. While grid-connected generation expansion is usually governed centrally, distribution is largely a decentralised task involving a multitude of sub-national stakeholders. It can include reaching sparsely populated areas where the state lacks representation. The Democratic Republic of Congo (DRC) serves as a case in point. While several electrification initiatives are targeting DRC to develop the prestigious hydro dam at Grand Inga valued at a record-setting 44 GW, considerably less efforts concern how to increase electricity access in a country where rural electrification is estimated to be below 1% (World Bank, 2018).

With regards to economic issues, the present private company funding mechanism quickly pulls foreign companies into the electrification market in SSA. The market, which features the fastest growing demand worldwide (International Energy Agency, 2016b), is thereby effectively ceded to the foreign private sector. Between 2010 and 2015, Chinese companies alone were responsible for 30% of new capacity additions in SSA, a number that rises to 46% if South Africa is excluded (International Energy Agency, 2016a). Power Africa's project pipeline includes over 100 transactions involving the US private sector which are set to increase US exports by USD 7 billion (Power Africa, 2017). Crucially, there currently is no obligation of a shared value approach in return, where the private companies align their business objectives to Africa's societal challenges or actively foster the diffusion of knowledge. This is complicating the long-term development of an already technologically inferior domestic African electrification industry. Thomas Piketty argues that "[n]one of the

Asian countries that have moved closer to the developed country in the West in recent years has benefited from large foreign investment, whether it be Japan, South Korea, or Taiwan, and more recently China. In essence, all of these countries themselves financed the necessary investments in physical capital” ((Piketty, 2014), p.89-90). Furthermore, companies supported through Power Africa as well as Chinese companies have thus far heavily focused their activities on relatively stable, high-growth markets in selected Western, Eastern and Southern African countries as opposed to Sahel and Central African countries (International Energy Agency, 2016a; Power Africa, 2017). This raises concerns of cherry-picking the most profitable markets rather than pursuing a holistic developmental approach.

Additionally, using aid to finance non-African companies can be seen as an extreme version of tied aid (where recipient governments are required to spend the aid on goods and services from the donor country). In the case of SSA’s power sector, donor countries like the US or China effectively choose which company is awarded a project in SSA, thereby reducing transparency for African governments compared to when they can procure services themselves. Tied aid has been widely argued to be economically inefficient for recipients. The additional costs incurred through tied aid have been estimated to range between 15 – 30% for goods and services (Clay et al., 2008). With respect to Africa’s power sector, Uganda’s President Yoweri Museveni has blamed the US developers of the Bujagali hydro dam for recent tariff increases in the country. As a consequence, the Ugandan government has emphasised its intentions to rely more heavily on domestic finance for Uganda’s electricity sector in the future. A contrary model to a donor country pre-selecting a project developer are competitive auctions where project developers can submit bids and the cheapest, viable proposal is awarded the contract. Renewable energy project auctions in South Africa’s Renewable Energy Independent Power Producer Procurement Programme (REI4P) and Zambia’s Scaling Solar initiative have led to some of the lowest solar PV tariffs in the world at around USD 0.06 per kWh. Despite repeated efforts from the OECD to curtail tied aid, as of 2012, over one-third of U.S. total development aid was tied to procurement in the U.S. (Hook and Rumsey, 2016).

In terms of environmental concerns, short-term profit maximisation may impede ecological sustainability. Natural gas plants in SSA cost USD 600 – 1000 per kW, 20–60% of the cost of renewable energy technologies (International Renewable Energy Agency, 2013). While Power Africa intends to promote renewables, natural gas has instead accounted for around 70% of financially closed capacity additions facilitated through Power Africa so far (Power

Africa, 2017). As associated capacity factors are 1.5 – 4 times higher than for renewables (Trotter et al., 2017a), the share of carbon-based electricity in SSA is effectively increasing through current Power Africa projects. As long-term projections suggest financial optimality of renewables in SSA (International Renewable Energy Agency, 2015; World Energy Council, 2013), building fossil fuel plants today incurs avoidable, yet currently unconsidered long-term restructuring costs due to switching from fossil fuels to renewables.

In summary, the current aid spending mechanism has produced a foreign dominance in SSA's power sector which is set to increase the future reliance on foreign assistance. As political investment risk factors have not markedly improved in SSA in recent years (Trotter et al., 2018), foreign companies are likely to depend on security guarantees similar to those given by OPIC and EXIM in the future. Hence, the current foreign support mechanisms are at danger of further increasing the sub-Saharan African power sector's dependence on foreign aid. This constitutes a paradox, given that the ultimate goal of giving aid is commonly to decrease aid dependency in the future. This goal of decreasing aid dependency in the long run was explicitly brought up during the US House Hearing which discussed the legal basis for Power Africa (U.S. Government, 2014).

Implications of the increasing number of foreign financiers

The increasing number of foreign financiers has raised the amount of available finance in SSA's power sector. As current level FDIs have been found to be an important driver for future investments in Africa (Mijiyawa, 2015), today's growing activity is likely to facilitate follow-up investments which are crucial to meet the high capacity requirements in the coming decades (Figure 3). Once Power Purchase Agreements (PPAs) have been signed, a steady and secure flow of capital has benefited timely construction of power plants. Externally financed Uganda's GET FiT initiative or South Africa's REI4P serve as examples in this regard.

Yet, several concerns arise from the growing number of foreign financiers. While overall ODA to SSA has remained constant, aid devoted to the energy sector has sharply risen since 2007 (OECD, 2018). As international efforts coupled to energy increase, African governments have an incentive (or a necessity) to spend their budget elsewhere. As foreign investments increased threefold between 2014 and 2015, African governments decreased theirs by 30% in 2015, and by a further 30% in 2016 (Figure 1). They have accounted for only 16% and 19% of SSA power sector capital expenditure in 2015 and 2016, respectively, roughly a third of

the share in the early 2000s (Foster and Briceño-Garmendia, 2010). Albeit different circumstances, increased foreign finance has similarly coincided with reduced African public investments during the SAPs in the 1980s and 1990s (Stein, 2003). The resulting decreased African ownership threatens rural electrification and energy equality, both have been shown to benefit from strong African accountability (see (Ahlborg et al., 2015; Kroth et al., 2016; Trotter, 2016) for econometric analyses, as well as (MacLean et al., 2016) for qualitative evidence on the importance of accountability in SSA's electrification).

A high share of foreign private sector stakeholders furthermore complicates accurate and efficient power infrastructure planning on several fronts. For instance, new challenges arise for reaching mutually satisfying agreements for power transactions which have to be carefully taken into consideration when matching future demand and supply. For instance, the negotiation process of PPAs between a national utility and an international developer can substantially prolong power projects. In Ethiopia, Icelandic generation company Reykjavik Geothermal in 2013 planned that the PPA for its 520 MW Corbetti geothermal project would be signed in Q1 2015 (Reykjavik Geothermal, 2013). Yet despite support from Power Africa, the signing of the PPA between RG and Ethiopian utility company Ethiopian Electric Power (EEP) was delayed by almost three years until December 2017. A senior EEP official explained the delay by pointing out that since it was Ethiopia's first PPA, EEP lacked the technical capability to negotiate with an international energy firm equipped with an experienced legal team (Ezega, 2017). This prompted EEP to hire a legal consulting firm with financial support from the African Development Bank.

In addition, the increased number of stakeholders puts pressures on Africa's electrification institutions. For instance, after Côte d'Ivoire had opened up its domestic for private generation companies in 1994 by signing a PPA with CIPREL, owned by French generation company Eranove, an overhaul of power sector regulations ensued which created redundancies and unclear responsibilities. Numerous new institutions were installed, such as a supervisory body for national utility EECI, national electrification finance and technology institutions, and a panel to design national policy for electricity. Edjekumhene and Dubash (2002) describe the resulting governance complexities. They note that "[a]s a result, regulation, planning, and policymaking within the sector became increasingly duplicative and unclear. As one observer noted, 'each private operator can literally pick the government body with which it is comfortable in order to solve its problem with the lowest possible risk'" ((Edjekumhene and

Dubash, 2002), p.123). The ensuing information asymmetry within the sector's governing bodies have complicated centralised infrastructure planning for efficient resource usage.

Implications of the current support beyond physical infrastructure

The initiatives' broadness is crucial to overcome institutional inefficiencies and capacity shortfalls (Trotter et al., 2017b). Their model, however, carries the risk of using generalised, pre-defined policy support toolkits for highly country-specific issues, a common problem of SAPs and PRSPs (Stein, 2003). Uganda, for instance, has been frequently called a 'donor-darling' due to the heavy involvement from the International Financial Institutions in the country. However, it has suffered from low electrification rates and sector inefficiencies. The World Bank itself has acknowledged this problem in its assessment of its power sector engagement the 1990s and 2000s. A 2008 World Bank report on Uganda's power sector noted that "[t]he Bank's power sector policy and lending strategies of the 1990s, with their strong emphasis on unbundling and privatization, did not lead to better performance of the sector and increased access, because they were not applied with due consideration to the country's characteristics" ((World Bank, 2008), p.xii). Specifically, the World Bank underestimated the effects private sector participation in the sector would have for Uganda. The Ugandan government was unable to address its contingent liabilities created through private sector participation in major power projects. System costs increased and projects struggled with delays. As a consequence, the World Bank was forced to officially rate performance in Uganda's energy sector between 1991 and 2001 as "unsatisfactory" (World Bank, 2008). Despite these experiences, issues of overly broad approaches to the governance of electrification in SSA appear to remain present. Of all current external sub-Saharan African electrification initiatives reviewed by Quitzow et al. (2016), a vast majority of 84% focus on the entire sub-continent, whereas only 14% have a regional focus such as East or West Africa. This raises the concern to which extend the considerable differences of specific regions within SSA are currently being considered in most international initiatives.

A multitude of such regional and country-level issues exist which require highly specialised governance approaches to achieve universal energy access. Complicated geographical settings are well-known to cause governance challenges in SSA, for instance in the Sahel countries and Sudan (Herbst, 2000). As electrification in SSA becomes more decentralised in remote areas, stakeholders need to be able to deal with highly specialised socio-cultural issues of rural constituencies. Some countries or territories, for instance Somalia, Central African

Republic or Northern Nigeria, cannot electrify without conflict resolution and ensuring basic security. Notably, continental-scale initiatives like Power Africa or Chinese efforts have mostly been unable to provide electrification endowments to such complex country cases (International Energy Agency, 2016a; Power Africa, 2017).

Property rights with regards to land ownership, crucial for infrastructure construction, are another area where broad foreign interventions are at danger to not comprehensively incorporate the deeply country-specific and often informal institutions involved. Only a small fraction of land in SSA is titled and free to trade (Boone, 2014). Complex, socio-cultural customary land tenure regimes dominate. A lack of sensitivity towards these issues by applying broad developmental policies have been argued to inflame new forms of territorial politics and conflict in Côte d'Ivoire (Boone, 2007). With respect to the electricity sector, foreign companies who have bought land on a large scale for energy projects have become increasingly subject to protest in SSA (International Renewable Energy Agency, 2015a). In Uganda, transmission company UETCL has recently struggled with complex land tenure regimes while trying to secure land for new transmission lines. In response, the government has developed a plan to amend the constitution allowing it to take land without permission if a certain project is of national developmental importance. This has sparked a highly politicised debate in the country, the implications of which are difficult to predict for foreign stakeholders. For instance, the German-led GET FiT programme has achieved notable progress in its core task to increase generation capacity in Uganda, but has identified bottlenecks in Uganda's transmission and distribution grid as its single most significant and, crucially, entirely exogenous risk for achieving its targets (KfW, 2017). Land access for solar PV plants in Nigeria are known to be problematic for foreign investors, despite the country's high solar PV targets (Ohunakin et al., 2014).

Implications of the current conditionalities

The assistance conditionalities currently in place, such as free market reforms, import tax reductions and cost recovery requirements, further benefit foreign companies (Trotter and Abdullah, 2017). International pressure to cut subsidies and reduce import taxes undermines political self-determinism of the African developmental state (Mkandawire, 1999). Yet taxing imports and subsidising domestic companies are key policy instruments to protect domestic African infant electrification industries. In 2014, the Kenyan government dropped import taxes for all solar energy products to lower costs for solar PV installation in the country. While

the move has been hailed by non-profit organisations like UK charity Solar Aid, it has been criticised by Ubbink East Africa, the first solar module manufacturer in Kenya. Its managing director Haijo Kuper said that “[t]he new tax exemption, while being a very noble idea on the surface, will have negative effects on local manufacturers. The vibrant solar energy market that Kenya has developed will be flooded with cheap imports” (originally quoted in (Willis, 2014)).

The setting of electricity tariffs in SSA constitutes another area which is subject to external pressure. International organisations and initiatives involved in SSA’s power sector such as the World Bank and Power Africa demand the implementation of fully cost-reflective electricity tariffs (Kojima et al., 2014; US Agency for International Development, 2016). They explicitly question the usefulness of lifeline tariffs where the first few units of consumed electricity are sold cheaply to enable access for low income users. Historically, however, successful large-scale electrification cases have demonstrated the significance of a growing domestic electrification industry and considerable state intervention such as cross-subsidies and lifeline electricity tariffs, especially to serve the rural poor (e.g. in Korea, Thailand and Russia, see (Barnes and Floor, 1996; Van Gevelt, 2014)). In Peru, power sector privatisation with cost-reflective tariffs created important incentives for distribution companies to expand access, yet caused price increases which adversely affected the welfare of low-income consumers (Anaya, 2010). They had to be countered through a cross-subsidy social tariff scheme, which partly offset the price effects for low-income users.

Implications of different levels of state interventionist electrification approaches in Africa are salient when comparing the cases of Ghana and Botswana to the cases of Uganda and Zimbabwe. Ghana managed to increase its rural electrification rate from 1% in 1990 to 63% in 2014 (World Bank, 2018), deeming it one of the most remarkable rural electrification success stories in SSA. Despite continued pressure from the IMF and the World Bank since the 1990s, Ghana’s government has managed to maintain ownership of its power sector and independently direct a state-driven approach to electricity provision (Edjekumhene and Dubash, 2002; Trotter, 2016). In one of its PRSP reviews, the IMF has criticized Ghana’s insistence on keeping lifeline tariffs for low income households (International Monetary Fund, 2004). State interventionist policies including lifeline tariffs have been key to expand affordable access in Ghana, leading to the citizenry holding long-standing expectations towards the government to provide electricity (MacLean et al., 2016). Although system costs are comparably low and the bill collection rate at 95%, Ghana’s tariffs for customers are too

low to recover the costs, requiring state subsidies to the utility (Trimble et al., 2016). Crucially, Ghanaian governments have understood rural electrification as part of a greater task of developmental nation-building. Similarly, Botswana has achieved notable rural electrification increases, largely driven by developmentalist, state-driven policies. After the government found that its original cost-recovery approach was too expensive for much of its rural population, it significantly decreased the initial down-payment required for a connection to a low standard rate. The remaining connection fee could be paid over a 15-year period. The government furthermore finances the extension of the grid to villages. As a result, 80% of the people connected through Botswana's Rural Electrification Collective Scheme could not have been connected if the scheme had not existed (Prasad, 2008).











By contrast, Uganda's rural electrification rate has remained below 10%. The World Bank provided its first-ever loan to Uganda in 1962 to expand the Ugandan electricity network, with subsequent frequent engagements "cementing the Bank as a dominant advisor and funder of projects until the early 2000s" ((MacLean et al., 2016), p.114). Neoliberal reforms were implemented, including a full unbundling of the Uganda Electricity Board in 2001. A large-scale privatisation of the sector limited governmental accountability and its capability to intervene. Consistent with the current international electrification initiatives' focus on generation expansion, subsequent investments in Uganda greatly focused on highly visible generation projects rather than costly and decentralised distribution to villages far-removed from the grid. This has led to limited rural electrification gains. Uganda is one of only two countries in SSA which manage to cover the total costs of electricity services through what they collect from electricity customers (Trimble et al., 2016). The average cash collected per kWh from customers is 60% higher than in Ghana despite similar system costs. While a lifeline tariff exists in Uganda, private distribution company UMEME Ltd., responsible for over 95% of distribution in Uganda (Electricity Regulatory Authority, 2016), only applies it to the first 15 kWh per month (for comparison, in Kenya, the lifeline tariffs is applied to the first 50 kWh, and Ghana's two-stage lifeline tariff is effective for the first 300 kWh consumed per month). UMEME's profit-driven approach has led it to repeatedly cut electricity access for low-income customers, as well as to hospitals and health centres where bills were overdue. In some areas, this has significantly affected the ability to deliver adequate health care services (Walukamba, 2014). The Ugandan experience is comparable to Zimbabwe's, where the power sector has been dominated by neoliberal, market-based and cost-recovery oriented policies

since World Bank interventions in the 1990s (Söderholm, 1999). Zimbabwe's rural electrification in 2014 has similarly remained below 10%.

Consistent with Van Gevelt's (2014) argument for South Korea, these African cases suggest that in the absence of profitable sales markets, successful rural electrification appears to be more likely to occur where it has been driven by the state as part of an integrated, long-term national development strategy rather than being left to market forces.

Summary of implications and impact

Table 1 summaries the implications of the four identified foreign support mechanisms in SSA's electricity sector as well as their potential impact on development sustainability.

Foreign support mechanism	Implications	Potential impact on developmental sustainability
1. Usage of aid to finance non-African companies	Direct involvement of the private sector	 Increased scale to realise economic development potential
	Mandate focusing on business interests	 Challenge for large-scale rural electrification as low income levels often prohibit profitable electricity sales
	African electrification market ceded to global companies	 Exacerbated domestic industry development and economically inefficient way of spending aid
	Growing importance of financial vis-à-vis environmental decision criteria	 Danger of de-prioritising renewable and decentralised off-grid solutions due to higher investment cost per MW
2. Increasing number of foreign financiers	Unprecedented level of finance availability	 Likely effect of further subsequent investments by overcoming the initial finance barrier
	Decreased incentive for African domestic investments	 Long-term threat through decreased African ownership and donatee mindset
	Increased complexities for comprehensive power system planning	 Risks of establishing a sub-optimal institutional setup as well as inefficient resource usage
3. Support beyond physical infrastructure	Institutional reforms and capacity building	 Improved capacities for delivering successful electrification programmes long-term
	Increased dependence on foreign broad-brush interventions	 A variety of highly country-specific issues are not addressed through standardised interventions
4. Conditionalities	Limited policy options for African governments	 Historically successful state intervention policies and domestic industry protection (cf. Korea, Thailand, Russia, Ghana, Botswana) are more difficult to implement

Legend:  flags a potentially positive, and  a potentially negative impact on developmental sustainability.

Table 1: Implications and impact of foreign support mechanisms

RECOMMENDATIONS AND CONCLUSION

While foreign involvement is starting to overcome several electrification barriers in SSA, its current design implies different developmental issues. We recommend a complementary mix of interventions for each of the four identified mechanisms.

1. Redirect foreign public funds:

- Rural electrification needs to be the biggest public sector priority in SSA to increase access figures substantially. As profit-driven approaches are unlikely to solve the problem, foreign public funds should be redirected towards socially-minded finance instruments to enable universal rural electrification. Available proven approaches include long-term rural electrification cross-subsidies, affordable credit lending with long-term loan repay times, credit co-operations, renting and East African pay-as-you-go schemes (Abdullah and Jeanty, 2011).
- A self-sustaining, domestic electrification industry would help reduce foreign dependencies and tackle electrification long-term (Trotter and Abdullah, 2017). Public electrification initiatives should aim to develop the African private sector rather than relying on foreign companies. The creation of adequate knowledge and skill levels is key for any successful domestic industry. To foster knowledge transfer, participation in SSA's rapidly growing electrification market should be viewed as an African asset. In the medium-term, market access could be priced with technology transfer to African companies. For instance, China requires foreign technology companies to form joint ventures with technologically inferior Chinese companies (Si and Bruton, 1999). In addition, minimum local job creation and local content levels should be mandatory, similar to South Africa's REI4P requirements (International Renewable Energy Agency, 2017).
- Public efforts to develop a domestic African electrification industry should focus on renewable energy technologies. Their evolving nature, small-scale applicability in beyond-the-grid systems, and high future demand make near-term competitive advantages more likely than other technologies. This would furthermore limit future infrastructure restructuring costs.

2. Increase African ownership:

- To lessen African governments adapting a mindset of relying on foreign investments and encourage domestic African finance and electrification investments, foreign funds

could be coupled to African commitments more tightly, functioning as variable top-ups of the latter where applicable.

- To manage the growing number of stakeholders, African electrification agencies need to be supported to improve managerial and procedural efficiencies. A stronger cooperation of donor initiatives would decrease interfacing requirements and create synergies (see (Tagliapietra and Bazilian, 2017)). For example, the newly established Sino-German Center for Sustainable Development provides German-administered vocational training to Africans in Chinese-led infrastructure projects in SSA.

3. Customise policy interventions:

- The spectrum of non-technological assistance should be widened and more closely designed according to country-specific circumstances. Where population densities are low, electrification agencies and state-owned enterprises should be supported to move from established grid-focused business models to new, more decentralised governance approaches which are able to cope with off-grid rural electrification at scale. Furthermore, where necessary, interventions should target security increases, sub-national energy inequalities reductions, and socio-cultural considerations. To create transparency and manage investor expectations, policy interventions should be communicated with accurate timelines for change to materialise.

4. Ease current types of conditionalities:

- Conditionalities related to market-based reforms and cost-recovery requirements should be made more flexible to allow state intervention where rural electrification does not offer short-term financial gains. To foster African governments' political will to lead long-term electrification, it is crucial to not repeat the mistakes of SAPs which undermined African self-determinism and resulted in many African governments falling out with international financial institutions. As the SDGs necessarily includes all countries in SSA, political conditionalities attached to finance directly oppose the SDGs' inherent comprehensiveness.

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